

What is claimed is:

1. A gear coupler for a power transmission comprising:

an outer race having a cylindrical inner surface;

an inner race having a cylindrical outer surface with spaced apart ramped surfaces;

a plurality of rollers seated between said inner and outer race;

a controllable cage having a plurality of cage pins alternately seated between adjacent pairs of rollers for engaging said rollers with said ramped surfaces; and

a shifting ring coupled to said cage for axial movement therealong for selectively aligning said rollers between said ramped surfaces to disengage said inner race from said outer race and allow relative rotation therebetween and for wedging said rollers against said ramped surface to engage said inner race with said outer race and prevent relative rotation therebetween in response to varying rotational speeds of said inner and outer races.

2. A gear coupler as set forth in claim 1 wherein said inner race includes a support portion defining said ramped surfaces and a slotted portion extending axially from said support portion and having a slot longitudinally disposed therealong.

3. A gear coupler as set forth in claim 2 wherein said shifting ring includes a cylindrical center opening for axially receiving said slotted portion of said inner therein and a shifting pin projected radially therefrom and received in said longitudinal slot of said inner race.

4. A gear coupler as set forth in claim 3 wherein said cage includes a cage ring spaced longitudinally from a cage plate and said rollers rotatably coupled therebetween and seated between said inner and outer race.

5. A gear coupler as set forth in claim 4 wherein said cage includes a cam plate projecting longitudinally from said cage ring; said cam plate including a generally V-shaped cam notch for cooperating with said shifting pin as said shifting ring moves axially along said cage.

6. A gear coupler as set forth in claim 5 wherein said cam notch includes a lower section spaced to cage said shifting pin and prevent rotational movement therebetween and an upper contoured section spaced to allow rotation movement of said cage relative to said shifting ring, whereby said axial movement of said shifting ring relative to said cage to position said shifting pin in said lower section of said cam notch aligns said rollers between said ramped surfaces of said inner race to disengage and allow relative rotation between said inner and outer race and axial movement of said shifting ring to position said shifting pin in said upper section allows rotation of said cage to wedge said rollers against said ramped surface between said inner and outer race to prevent relative rotation therebetween.

7. A gear coupler for a power transmission, said gear coupler 10 comprising:

an inner race comprising a slotted section, said slotted section including a slot longitudinally disposed therealong;

an outer race rotatably coupled to said inner race;

a shifting ring for engaging said inner race and said outer race;

a cage longitudinally disposed between said inner race and said outer race, said cage comprising a cage ring and a cam plate extending longitudinally from said cage ring;

a cam notch disposed on said cam plate; and

a shifting pin positioned through said shifting ring such that said pin seats within said slot and said cam notch, thereby selectively aligning said shifting ring, said inner race and said cage, wherein said shifting pin follows along said cam notch in response to axial movement of said shifting ring to allow rotation of said cage about said inner race.

8. A gear coupler as set forth in claim 7 further comprising a roller disposed between said inner race and said outer race for reducing friction between said inner race and said outer race, said roller being freely rotatable when said inner race and said outer race are disengaged.

9. A gear coupler as set forth in claim 8 wherein said cage further comprises a cage pin extending longitudinally from said cage ring such that rotation of said cage rotates said cage pin around said inner race.

10. A gear coupler as set forth in claim 9 wherein said cage pin is disposed between said inner race and said outer race adjacent said roller such that rotation of said cage pin around said inner race causes rotation of said roller around said inner race.

11. A gear coupler as set forth in claim 10 wherein a plurality of said rollers and a plurality of said cage pins are alternately disposed between said inner race and said outer race.

12. A gear coupler as set forth in claim 11 wherein said inner race further comprises a support section, said support section having a ramped surface disposed thereon such that said roller wedges between said ramped surface and said outer race to engage said inner race and said outer race.

13. A gear coupler as set forth in claim 12 wherein a plurality of said ramped surfaces are disposed about said support section, said ramped surfaces being spaced apart.

14. A gear coupler as set forth in claim 13 wherein said cage further comprises a cage plate longitudinally spaced from said cage ring such that said cage pin extends longitudinally from said cage ring to said cage plate.

15. A gear coupler as set forth in claim 14 wherein said cage plate 14 rests within said outer race.

16. A gear coupler as set forth in claim 15 further comprising an end cap disposed adjacent said cage ring.

17. A gear coupler as set forth in claim 16 wherein said end cap rests within said outer race.

18. A gear coupler as set forth in claim 17 further comprising a retaining ring disposed between said shifting ring and said cage ring.

19. A gear coupler as set forth in claim 18 wherein said inner race further comprises a generally cylindrical outer surface.

20. A gear coupler as set forth in claim 19 wherein said outer race comprises a generally cylindrical inner surface.